

## PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

## Reinforced Plaster Panels and Process For Their Manufacture

We, SOCIÉTÉ ANONYME DES MANUFACTURES DES GLACES ET PRODUITS CHIMIQUES DE SAINT-GOBAIN, CHAUNY & CIREY, a French Company, of 1 bis, Place des Saussaies, Paris (VIIIe), France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

The object of the invention is to provide plaster boards or panels which are reinforced with mineral fibres, in particular glass fibres, for constructional use more particularly in the manufacture of partitions having good mechanical and fire-proof characteristics. It also refers to a process by continuous pressing for the manufacture thereof and a device for putting this process into effect.

Panels according to the invention consist of a board formed of an intimate mixture of cellular plaster and mineral fibres and at least one external layer of non-cellular plaster, which contains a tissue of glass fibre forming an integral part of the panel.

The invention also covers a continuous process for the manufacture of these panels. According to this process, an intimate mixture of plaster, more or less expanded according to the final density sought, and of mineral fibres is prepared in a continuous manner, and in the form of boards, to which a tissue of glass fibres soaked in pure plaster is applied to one or both sides thereof the whole being brought between pressing devices so as to assure the simultaneous setting of the plaster constituent of the boards and also that of the tissues applied thereto.

The mass forming the board of cellular plaster and fibres may consist of fine plaster in a normal or thick mix, expanded by means of a foaming agent. Expansion may be up to 100%. The normal mix may be of the order of 50 grams water to 100 grams dry plaster, whilst the thick mix may be of

the order of 30 grams water to 100 grams dry plaster. The mineral fibres intimately mixed with this mass may be glass fibres of a diameter of several tens of microns, in particular of the order of 30 microns, and of a length of several cm, in particular 1 to 3 cm. Good results are obtained by intimately mixing 5 to 10 gm. of these fibres with 100 gm. approx. of dry plaster and 50 gm. of water to which a foaming agent has been added.

The incorporation of the fibres is facilitated by means of a prior foaming of the mixing liquid and high speed stirring at the moment of incorporation. Actually, the glass fibres used occupy in practice, even when compact and wet, a volume at least equal to three times that of the mixing liquid.

By adding cationic surface active products the sliding of the fibres over one another may be facilitated and consequently their dispersion be affected.

The glass tissues used may consist of porous and coherent layers of fibres interlaced or parallel with a diameter of the order of 10 to 40 microns. They are immersed in pure plaster, the setting rate of which is preferably of the order of that of the plaster forming the board and the two mixes can be prepared simultaneously. It is necessary for the two setting times to be near to one another so as to obtain a good adherence.

The invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings in which:

Fig. 1 shows in section a panel in accordance with the invention formed of a central board having on its two faces a tissue of glass fibres immersed in pure plaster. In this figure, the central board 1, formed of an intimate mixture of cellular plaster and mineral fibres, forms one body with two layers of pure plaster 2 in which there is immersed a glass fibre tissue 3; and

Fig. 2 shows a longitudinal view of a device for effecting the continuous process in accordance with the invention for the manufacture of these panels.

- 5 In this figure, mixing liquid 11 (water with the addition of a foaming agent) is sent to the interior of a compartmented chamber 12 over a turbo stirrer 13 which forms a foam by means of a current of compressed air 10 coming from a feed conduit 14 and passes by continuous increase of its volume into the interior of the following compartment where the mineral fibres 15 are incorporated in it by means of a second turbo stirrer 16. The 15 resultant product progresses by normal increase in volume towards the last compartment where the plaster in powder form 17 is added and where an intimate mixture is effected by means of mixing devices 18.
- 20 The resultant mixture escapes from chamber 12 through aperture 19 which is equipped with mechanical means not represented which would allow of its expulsion on to a conveyor belt 20 on which it is spread. The 25 mixture then passes over a conveyor belt 22 after having been pressed to the required thickness by a pressure roller 21.

On either side of this mixture at the outlet from belt 20 there are arranged the tissues 30 of glass fibre 23. These, unrolling from bobbins 24, pass through a bath 25 of pure plaster to which a suitable agent such as borax may be added in order to retard the setting of the plaster.

- 35 The bottom tissue receives the mixture at the outlet from belt 20.

After application of the two tissues 23 immersed in pure plaster, the whole engages between the two endless belts 22 and 27, 40 between which it is subjected to slight pressure. This pressure is assured over the whole passage of the assembly by press devices 26. Belts 22 and 27 are preferably very smooth metal bands. The completed product 28 45 leaves these two bands and the moment of leaving coincides substantially with the setting of the plaster.

What we claim is:—

1. A reinforced plaster panel comprising 50 an intimate mixture of cellular plaster and mineral fibres and at least one external layer of plaster which incorporates a tissue of glass fibre, the layer or each layer forming an integral part of the panel.
2. A process for the manufacture of panels 55 as claimed in Claim 1 wherein the intimate mixture of cellular plaster and mineral fibres is prepared continuously and is shaped into the form of a board, and wherein a tissue of 60 glass fibres soaked in plaster is applied to at least one side of the board which together with the layer or layers is drawn between pressing devices whereby the plaster of the board impregnates the layer on each layer 65 so that it becomes an integral part of the

panel when the plaster has set.

3. A process according to Claim 2 wherein the mass constituting the board consists of fine plaster in a normal mix of the order of 50 grams of water for 100 grams of dry plaster or in a thick mix of the order of 30 grams of water for 100 grams of dry plaster.

4. A process according to Claim 2 wherein a foaming agent enabling the plaster to be expanded up to 100% is added to the water 75 for mixing the plaster forming the board.

5. A process according to Claim 2 wherein the mineral fibres intimately mixed with the plaster to form the board have a diameter of several tens of microns, in particular of 80 the order of 30 microns, and a length of several cm., in particular 1 to 3 cm.

6. A process according to Claim 2 wherein the proportion of fibres intimately mixed with the plaster to form the board is of the 85 order of 5 to 10 gm. of fibre for 100 gm. of dry plaster.

7. A process according to Claim 2 wherein a cationic surface active product is added to the fibres intended to be intimately mixed 90 with the plaster.

8. A process according to Claim 2 wherein the glass tissues immersed in the plaster consist of coherent layers of fibres interlaced or parallel, having in particular a diameter 95 of 10 to 40 microns.

9. A process according to Claim 2 wherein the tissues of glass are immersed in pure plaster, the rate of mixing of which is similar to that of the plaster used for the pre- 100 paration of the centre body, the two mixes being effected so as to achieve similar setting times.

10. Apparatus for effecting the process as claimed in Claim 2 comprising means for a 105 supply of liquid, including a foaming agent, and compressed air, means for mixing the liquid and air so that a foamy liquid is formed, means whereby mineral fibres may be introduced into the foamy liquid and mixed 110 therewith, means whereby dry plaster may be mixed with the foamy liquid, means for forming the mixture of plaster and fibres into a board and means for applying a tissue of glass fibres soaked in plaster to one or both 115 sides of the board.

11. Apparatus according to Claim 10 wherein three inter-communicating compartments are provided each having an agitating device, the first compartment receiving the 120 liquid and compressed air where it is mixed by the agitating device to form the foamy liquid which then passes to the other compartments where glass fibres and dry plaster are added in turn to the foamy liquid and 125 mixed by the agitating devices in the compartments, the resulting mixture being discharged through an aperture in the third compartment.

12. Apparatus according to Claim 10 or 130

11 comprising a roller for pressing the mixture of liquid, foaming agent and mineral fibres to a required thickness and a conveyor belt on which the mixture is spread and conveyed between two tissues of glass fibre immersed in pure plaster.

13. Apparatus according to any of Claims 10 to 12 wherein the tissues of glass fibre unrolled from feed bobbins pass through a bath of pure plaster and as soon as they are soaked in the plaster are brought into contact with the plaster board, made of cellular plaster and glass fibres, on either side thereof.

15 14. Apparatus according to any of Claims 10 to 13 wherein once the plaster board has been put in contact on its two faces with the tissues of glass fibre soaked in plaster, the assembly is introduced between two smooth endless belts, in particular between two

metal bands, between which it is compressed and whence it emerges, such emergence coinciding with the end of the setting of the plaster.

15. As a new article of manufacture a plaster board substantially as hereinbefore described in connection with Fig. 1 of the accompanying drawings.

16. A process of making plaster board as claimed in Claim 15 substantially as hereinbefore described.

17. Apparatus for carrying out the process claimed in Claim 16 substantially as hereinbefore described with reference to Fig. 2 of the accompanying drawings. 35

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